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UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
WASHINGTON

Notes on
DDT-Fish and Wildlife Relationships Meeting
Washington, D. C.
February 24, 1956

During the forenoon of February 24, 1956, a meeting was held in the Forest Service Conference Room for the purpose of discussing Forest Service spruce-budworm control projects and the recent fish losses on the Yellowstone River with representatives of the Departments of Interior and Agriculture and National Conservation organizations.

The following were present:

Conservation Organizations

Richard Stroud - Sport Fishing Institute
George Fichter - Sport Fishing Institute
Henry Clepper - Society of American Foresters
Harry Radcliffe - American Nature Association
Dan Poole - Wildlife Management Institute

U. S. Department of the Interior

Fish and Wildlife Service

A. V. Tunison
Paul Springer
Bruno Von Limbach
Fenton Carbine
John Gottschalk

National Park Service

Gordon Fredine
Warren Hamilton
Lawrence F. Cook

Technical Review Staff

John Shanklin

U. S. Department of Agriculture

Forest Service

Edward P. Cliff
Lloyd W. Swift
Everett R. Doman
James A. Beal
Everett H. Clocker
William W. Huber
Clint Davis
J. Robert Smith, Jr.

Agricultural Research Service

Clarence Hoffman

Invitations had also been extended to the American Forestry Association; National Wildlife Federation; Izaak Walton League of America, Inc.; The Wildlife Society; and Outdoor Writers' Association. Because of unexpected conflicts these organizations were not represented.

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Asst. Chief Edward P. Cliff outlined the purpose of the meeting and commented on the general subject of forest protection from devastating insect attack.

Lloyd Swift briefly summarized the Yellowstone River situation as follows: During July 1955 the Forest Service made aerial application of DDT at a rate of 1 lb. per acre to control spruce budworm within parts of the Yellowstone River drainage both inside Yellowstone National Park and on adjacent National Forest lands. About three months later, in October, fish began dying in the Yellowstone River. The losses continued into December when the Forest Service and Fish and Wildlife Service were first made aware of the situation. Investigation by Montana State University and State Biologists showed that there was very little insect life or other fish food left in the stream and remaining fish were in an emaciated condition. The Forest Service arranged for Dr. Brunson of Montana State University to make a survey of parts of the Bitterroot River since this drainage was also part of the 1955 budworm control project. His investigations showed that there was not a deficiency of bottom organisms in this stream. The same standard procedures of spraying had been followed in both the Yellowstone and Bitterroot jobs.

Immediately after the Forest Service became aware of the Yellowstone fish die-off, the Fish and Wildlife Service was contacted and arrangements made for Dr. Cope of the Fish and Wildlife Service and Donald Parker of the Forest Service Insect Research Division to make a trip to the Yellowstone area for the purpose of investigating the situation and assembling available facts.

The Forest Service is greatly concerned about the fish losses. This is the only significant loss that has occurred following Forest Service spraying. If the losses are due to the spraying, we want to know what was different here from other sprayed areas. It has been reported that a load of spray was dumped over the streams. Jettisoning of a load of spray occurred in one instance when a plane developed mechanical trouble. The load was dumped mainly over a forested area. Furthermore, fish losses have occurred in the River above the location where any part of this load of spray could have reached the River.

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James Beal, Chief of the Forest/Division of Forest Insect Research, briefly outlined the life history and destructiveness of the spruce budworm. He told how larval stages of this moth feed upon the current year's foliage of spruce, true firs, douglas fir, and to some extent pine. After four or more years of attack the trees die. Large acreages of forest have been destroyed by this insect. Dr. Beal also summarized the extensive research that had been done in developing suitable spray solutions and testing to determine minimum dosages needed to obtain effective control of the insect. This research has indicated that 1 lb. of DDT in 1 gal. of oil per acre is extremely effective in controlling the budworm, and is also a minimum dosage necessary to get adequate control through aerial spraying when applied during the late larval stages.

Everett Clocker, Timber Management, gave some statistics regarding the extent of Forest Service insect control programs involving defoliating insects in the Western States, and outlined how the spraying jobs are organized. Following research that had been conducted for several years and using this research to guide the program, aerial spraying with DDT for spruce budworm control was started on a project basis in 1949. Since that time some 5,600,000 acres of budworm-infested forest have been treated. 3,840,000 acres have been sprayed in Oregon and Washington, and additional acreage in Idaho, New Mexico, and Montana. Although some important fishing streams are found in these sprayed areas, the recent fish loss on the Yellowstone is the first instance where more than a few scattered fish losses have been found following Forest Service spraying operations. In these operations budworm control has been good and it has been necessary to respray only a minor acreage, for example, 10,000 acres in the largest project, the Oregon-Washington.

Mr. Clocker outlined the precautions taken to obtain uniformity in chemicals and in their application. All chemicals are tested before being applied. Adequacy of coverage is checked by use of sample cards on the ground and also by ground observers. Aerial observers are also in the air during the spraying operation. These observers, as well as the spray planes, and base of operations are equipped with radios to facilitate close contact and immediate corrections of any slip-ups in distribution or methods of application. The pilots are all briefed regarding precautions and procedures to use to safeguard wildlife values.

1956 plans are to spray 650,000 acres in Montana and 450,000 acres in Idaho.

Clarence Hoffman, Agricultural Research Service, told of research that had been conducted regarding effects of DDT on aquatic life. In initial experiments 5 lbs. of DDT were applied per acre. Only certain insect species that were at a vulnerable point in their life cycle were wiped out. Many other aquatic species were not affected. Decimated species did not recover for three months.

In another experiment in Pennsylvania, the spray plane flew directly up a stream course for 3 miles, applying DDT at a rate of 1 lb. per acre. Checks showed that only one-third of a pound per acre reached the stream. This resulted in 90 percent destruction of fish food organisms at sampling stations in riffle areas near the lower part of the sprayed stream. Losses were much less at upper sampling stations and in deeper water. Surveys indicated that less than 2 percent of the trout were killed.

The experimental work showed that young fish of the year were most vulnerable to DDT; also that DDT in oil solution resulted in more loss of aquatic life than when DDT was sprayed in a water emulsion. DDT is persistent and will accumulate on stream bottoms in moss.

In another area 50,000 acres were experimentally sprayed with 1 lb. of DDT per acre. This resulted in a 70 to 90 percent loss of fish food. There was some recovery in one month, and almost complete recovery in three months. Fish kill was minor, and occurred within one month, and was mainly among young fish of the year.

In the Tetons an application of 2½ lbs. of DDT per acre resulted in 50 per cent loss of aquatic organisms. There was very minor loss of fish in this stream which had a high amount of organic material.

Paul Springer, of the Fish and Wildlife Service, commented regarding research to determine effects of DDT on terrestrial animal life. This research showed that a single application of 1 lb. of DDT per acre has little effect on birds and mammals. Young birds were affected by 3 lbs. per acre dosage. An application of 5 lbs. per acre resulted in drastic reduction of birds.

Repeated applications of 2 lbs. of DDT per acre for five consecutive years seemed to result in a slight decrease of tree-top birds. No dead birds were found, and the decrease may have been due to migration from the area. This repeated application seemed to have no effect on mice, nor turtles.

Experimental feeding of DDT to quail and pheasants resulted in reduction of fertility and lowered survival of young.

Wetable powders were less dangerous than oil sprays.

Fenton Carbine, Fish and Wildlife Service, commented regarding the Yellowstone problem and research needs.

There is no previous history of fish die-offs on the Yellowstone River.

Fish and fish food organisms have died and may still be dying on 100 miles of stream within and below the area sprayed for budworm control. Fish are emaciated and starving. This is concluded from lack of fatty tissue and small size of liver. Stomach analyses show that the remaining fish are feeding mainly on moss and snails.

Dr. C. J. D. Brown has been sampling bottom organisms on the Yellowstone for several years. He had difficulty in finding any this year.

It was Dr. Carbine's opinion that after all factors are weighed, DDT must be blamed for the recent losses of fish and other aquatic life.

Research is needed to find out specifically what happened in this case, and also to prevent similar occurrences in the future.

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Discussion and questions following the above program indicated that the group understood the problems involved, and were not critical of the spruce budworm control program. They seemed to assume that the spraying would be continued and that every reasonable effort would be taken to prevent damage to wildlife resources. The need for research was mentioned and urged by several present.

Mr. Henry Clepper suggested that a complete bibliography be prepared on the subject of DDT as related to wildlife. Dr. Carbine said he would attempt to prepare this type of bibliography. Mr. Stroud submitted a partial bibliography on DDT and aquatic life which he had received from Dr. Carbine.

The next meeting of Federal agencies to discuss desirable research, and ways and means for accomplishing this research, will be called by Dr. Carbine.